Claims

1. An electrode system, comprising:

one or more separator materials formed into a bag having at least two seams,

the seams positioned so as to define a perimeter of a pocket configured to receive an electrode within the bag,

the seams being arranged such that at least one gap is formed between seams adjacent to one another along the perimeter of the pocket, and

at least one of the seams including a spacer positioned between portions of the one or more separator materials joined by the at least one seam.

2. The system of claim 1, wherein the spacer has a thickness greater than 10 μm along the one or more sides of the spacer that define the pocket.

3. The system of claim 1, wherein the separator includes an adhesive.

4. The system of claim 3, wherein the adhesive includes one or more components selected from the group consisting of acrylic, rubber, cellulose and silicone.

5. The system of claim 1, wherein the seams define a pocket configured to surround an electrode within the pocket.

6. The system of claim 1, wherein at least one fold in the separator material serves as a seam.

7. The system of claim 1, wherein the bag has an envelope shape.

8. The system of claim 1, wherein at least one seam the forms a gap includes a spacer.

9. The system of claim 1, wherein at least one of the separator materials includes one or more components selected from the group consisting of polypropylene and polyethylene.

10. The system of claim 1, further comprising:

an electrode positioned in the pocket and wherein the separator bag includes a lower edge extending between lateral edges, the bag also including one or more lateral seams positioned along a lateral edge of the separator bag and at least one lower seams positioned along the lower edge of the separator bag, the one or more lateral seams not being positioned above a distance equal to 50% of the electrode height from the lower seam, the electrode height being measure along the edge of the electrode adjacent to the lateral seam.

11. The system of claim 1, further comprising:

an electrode positioned in the pocket, the electrode having a tab extending from an edge of the separator bag, the tab including a tab opening extending through the tab.

12. The system of claim 1, further comprising:

an electrode positioned in the pocket, the spacer has a thickness greater than 20% of the electrode thickness.

13. The system of claim 1, further comprising:

an electrode positioned in the pocket, the spacer has a thickness in a range of 80% to 120% of the electrode thickness.

14. An electrode system, comprising:

an electrode; and

one or more separator materials formed into a bag having at least two seams that immobilize one portion of the one or more separator materials relative to another portion of the one or more separator materials, the seams defining a perimeter of a pocket that surrounds the electrode.

15. The system of claim 14, wherein the seams define four sides of a pocket, each of the pocket sides being adjacent to an edge of the electrode.

16. The system of claim 14, wherein at least one of the seams includes a spacer positioned between portions of the separator material joined by the at least one seam.

17. The system of claim 14, wherein the spacer has a thickness greater than 10 μm along the one or more sides of the spacer that define the pocket.

18. The system of claim 14, wherein the separator includes an adhesive.

19. The system of claim 18, wherein the adhesive includes one or more components selected from the group consisting of acrylic, rubber, cellulose and silicone.

20. The system of claim 14, wherein one or more of the separator materials includes one or more components selected from the group consisting of polypropylene and polyethylene.

21. The system of claim 14, wherein the separator bag includes a lower edge extending between lateral edges, the bag also including one or more lateral seams positioned along a lateral edge of the separator bag and at least one lower seams positioned along the lower edge of the separator bag, the one or more lateral seams not being positioned above a distance from the lower seam, the distance being equal to 50% of the electrode height, the electrode height being measure along the edge of the electrode adjacent to the lateral seam.

22. The system of claim 14, wherein the electrode includes at least one tab extending from a side of the bag, the tab includes an opening extending through the tab.

23. An electrode system, comprising:

one or more separator materials formed into a bag having seams that immobilize one portion of the one or more separator materials relative to another portion of the one or more separator materials, the seams positioned so as to define a perimeter of a pocket configured to receive an electrode; and

an electrode positioned within the pocket, the electrode having a tab extending from the bag, a tab opening extending through the tab and being open to an edge of the tab.

24. The system of claim 23, wherein at least one of the seams includes a spacer positioned between portions of the separator material joined by the at least one seam.

25. The system of claim 23, wherein the spacer has a thickness greater than 10 μm along the one or more sides of the spacer that define the pocket.

26. The system of claim 23, wherein the separator includes an adhesive.

27. The system of claim 23, wherein the separator bag includes a lower edge extending between lateral edges, the bag also including one or more lateral seams positioned along a lateral edge of the separator bag and at least one lower seams positioned along the lower edge of the separator bag, the one or more lateral seams not being positioned above a distance equal to 50% of the electrode height from the lower seam, the electrode height being measure along the edge of the electrode adjacent to the lateral seam.

28. An electrochemical cell, comprising:

an electrode system having an electrode of a first electrode type positioned in a pocket of a separator bag; and

an electrode of a second electrode type stacked on the separator bag, the perimeter of the portion of the anode adjacent to the bag matched to the perimeter of the portion of the bag adjacent to the anode such that the perimeter of the anode is aligned with the perimeter of the separator bag.

29. The cell of claim 28, wherein the first electrode type is a cathode and the second electrode type is an anode.

30. The cell of claim 28, wherein the electrode system is one of a plurality of electrode systems and the anode is one of a plurality of electrode systems, the electrode systems and anodes stacked on top of one another with anodes alternating with electrode systems, the peripheries of the anodes being aligned with the perimeter of the separator bags included in the

electrode systems.

31. The cell of claim 28, wherein the cathode and the anode each include a tab, the tab of the cathode extending from a side of the separator bag and not aligned with the tab of the anode.

32. The cell of claim 28, wherein the tab of the cathode and the tab of the anode each include a tab opening extending through the tab.

33. The cell of claim 32, further comprising:

a first electrode-receiving member including a post extending through the tab opening of the anode; and

a second electrode-receiving member including a post extending through the tab opening of the cathode.

34. A method of forming an electrode system, comprising:

joining regions of one or more separator materials so as to form the seams of a separator bag,

the seams being positioned so as to define a perimeter of a pocket configured to receive an electrode within the bag,

the seams being arranged such that at least one gap is formed between seams adjacent to one another along the perimeter of the pocket, and

at least one of the seams formed so as to include a spacer positioned between regions of the separator material joined by the at least one seam.

35. The method of claim 34, wherein the at least one seam is formed so as to have a thickness greater than 10 μm along the one or more sides of the spacer that define the pocket.

36. The method of claim 34, further comprising:

positioning an electrode in the pocket; and

forming at least one additional seam joining regions of the one or more separator materials after positioning the electrode in the pocket.

37. The method of claim 36, wherein the at least one additional seam acts with the other seams to define a pocket surrounding the electrode.

38. The method of claim 34, further comprising:

positioning an electrode in the pocket, the electrode including a tab with a tab opening extending through the electrode; and

positioning the electrode on a post of an electrode receiving member such that the post extends through the tab opening.

39. An electrode stacking system, comprising:

a stacking structure configured to be positioned in a case of an electrochemical cell, the stacking structure including a plurality of electrically conducting posts that are each configured to receive a plurality of electrodes, the posts being mechanically connected to one another and electrically isolated from one another.

40. The system of claim 39, wherein the stacking structure includes a plurality of recesses that are each configured to receive a feedthrough pin.

41. The system of claim 40, wherein at least one post is a part of a one-piece electrode receiving member, at least one of the recesses being defined in the electrode receiving member.

42. The system of claim 39, wherein each of the posts is a part of a one-piece electrode receiving member and each of the electrode receiving members are connected to an insulating member, the insulating member being configured to electrically isolate the electrode receiving members from one another.

43. The system of claim 39, further comprising:

a cell cover configured to be attached to the stacking structure and being configured to serve as a cover for an electrochemical cell.

44. The system of claim 43, wherein the cell cover includes a plurality of feedthrough pins and the stacking structure includes a plurality of recesses, the feedthrough pins configured to be received in the recesses upon attachment of the cell cover to the stacking structure.

45. The system of claim 39, further comprising:

a plurality of electrodes that each include a tab, the electrodes being positioned on a post that extends through a recess on each tab.

46. The system of claim 45, wherein the post is connected to an interface side of the stacking structure, at least a portion of the stacking structure interface side being positioned adjacent to an interface side of the tabs, the interface side of the tabs having a shape complementary to the shape of the stacking structure interface side such that the interface side of the tabs can sit flush against the interface side of the stacking structure.

47. The system of claim 45, further comprising:

a plurality of washers positioned on the post, at least one electrode being positioned between washers.

48. The system of claim 47, wherein a weld connects a plurality of the washers.

49. The system of claim 39, wherein the electrodes are each positioned in a pocket of a separator bag, the separator bag having at least two seams positioned so as to define a perimeter of the pocket, at least one of the seams including a spacer positioned between separator materials.

50. A method of forming an electrochemical cell, comprising:

positioning a plurality of electrodes on the posts of a stacking structure so as to form an electrode stack having anodes alternated with cathodes, the posts being mechanically connected to one another and electrically isolated from one another; and

positioning the electrode stack in the case of an electrochemical cell.

51. The method of claim 50, wherein the electrodes positioned on one of the posts are each positioned in a pocket of a separator bag, the separator bag having at least two seams positioned so as to define a perimeter of the pocket, at least one of the seams including a spacer positioned between separator materials.

52. The method of claim 50, further comprising:

attaching a cell cover to the stacking structure before positioning the electrode stack in the case.

53. The method of claim 50, wherein attaching a cell cover to the stacking structure includes positioning feedthrough pins on the cell cover into recesses on the stacking structure.